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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
BARNES, CRYSTAL J	
ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 05/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,330	KESHAVMURTHY ET AL.	
	Examiner	Art Unit	
	Crystal J. Barnes	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7,9-11,15 and 17-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,9-11,15,17-19,21 and 22* is/are rejected.

7)☒ Claim(s) *20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *17 Jan. '06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The following is a Final Office Action in response to the Amendment received on 29 March 2006. Claims 5, 6, 8, 12-14 and 16 have been cancelled. Claims 1-4, 7, 9-11, 15 and 17-22 remain pending in this application.

Information Disclosure Statement

2. The examiner has considered the information disclosure statement (IDS) submitted on 17 January 2006.

Specification

3. The disclosure is objected to because of the following informalities: the various substeps should have section headings to facilitate referencing back to previous described sections. Instead of referencing "sections 1 and 2" on page 8 line 12, use section headings (i.e., Creating a Part, Creating Area Clearance, Finish as You Go Strategy, Creating Internal Cavities and Channels, Soft Fixturing, etc.). It is unclear what "sections 1 and 2" on page 8 line 12 and "methods 1-6" on page 9 lines 8-9 refers to. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-4, 7, 17, 21 and 22 remain rejected under 35 U.S.C. 102(b) as being anticipated by USPN 5,398,193 to deAngelis.

As per claim 1, the deAngelis reference discloses an automated manufacturing method, comprising the steps of: receiving a description (see column 6 lines 24-25, "CAD/CAM representation") of an object to be fabricated ("prototype part") having a desired geometry (see column 4 line 41 and column 8 lines 32-35, "prespecified geometric tolerance"); identifying regions (see column 7 lines 41-46, "selected discrete areas of the discretized work surface") in which at

least one automated material addition process (see column 7 lines 64-68, "materials additive processes") and at least one automated material subtraction process (see column 8 lines 7-12, "materials subtractive, extractive, or removal") should occur to fabricate the object ("prototype part") in accordance with the description ("CAD/CAM representation"); generating toolpaths (see column 7 lines 30-35, "geometric control" and column 8 lines 7-11, "commanded") associated with the material addition ("additive process") and subtraction processes ("subtractive processing"); and fabricating the object ("prototype part") in accordance with the toolpaths ("geometric control, commanded").

As per claim 2, the deAngelis reference discloses the regions ("selected discrete areas of the discretized work surface") are layers (see column 6 lines 25-27, "layers"), volumes, lines or voxels ("slices").

As per claim 3, the deAngelis reference discloses the automated material subtraction process ("materials subtractive, extractive, or removal") includes milling (see column 8 line 12, "milling") or the use of lasers (see column 8 line 11, "laser"), knives, hot wires, arc cutters, or plasmas cutters.

As per claim 4, the deAngelis reference discloses the automated material addition process ("materials additive processes") includes solid-state or fusion

welding (see column 7 line 65, "power deposition and melting"), laser material deposition ("power deposition and melting"), metal spraying (see column 7 line 66, "plasma spraying"), or adhesive bonding.

As per claim 7, the deAngelis reference discloses further including the step of soft fixturing (see column 6 lines 46-51, "mask formation") multiple parts ("part layers").

As per claim 17, the deAngelis reference discloses further including the step of repairing (see column 8 lines 40-43, "complementary materials are deposited") an existing mold or other object ("empty regions of work surface").

As per claim 21, the deAngelis reference discloses certain features are deposited (see column 6 lines 63-66, "preformed masks") with excess stock ("gross contours") based on feature geometry (see column 6 lines 41-46, "desired geometry"); and removing material (see column 8 lines 7-11, "remove part and complementary materials") to enhance the deposition process (see column 7 lines 30-32, "materials additive"), or speed the build rate (see column 6 lines 50-51, "reducing the amount of additive processing") of the object ("formation of the layer").

As per claim 22, the deAngelis reference discloses further including the step of generating a conformal support material containment structure (see column 6 lines 55-59, "mask contours").

6. Claims 1-4, 9-11, 15, 18 and 19 remain rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,856,842 B2 to Rebello et al.

As per claim 1, the Rebello et al. reference discloses an automated manufacturing method, comprising the steps of: receiving a description (see column 2 lines 33-41, "parametric model 70") of an object ("part 10") to be fabricated having a desired geometry ("geometry"); identifying regions ("holes, lines, curves, chamfers, blends, radii") in which at least one automated material addition process (see column 3 lines 4-9, "material addition") and at least one automated material subtraction process ("material removal") should occur to fabricate ("manufacturing") the object ("part 10") in accordance with the description ("parametric model 70"); generating toolpaths (see column 3 lines 9-10, "tool path generation") associated with the material addition ("material addition") and subtraction processes ("material removal"); and fabricating ("manufacturing") the

object ("part 10") in accordance with the toolpaths (see column 3 lines 40-42, "tool path").

As per claim 2, the Rebello et al. reference discloses the regions ("holes, lines, curves, chamfers, blends, radii") are layers, volumes, lines ("lines") or voxels.

As per claim 3, the Rebello et al. reference discloses the automated material subtraction process ("material removal") includes milling or the use of lasers (see column 3 lines 42-43, "lasers"), knives, hot wires, arc cutters ("cutters"), or plasmas cutters ("cutters").

As per claim 4, the Rebello et al. reference discloses the automated material addition process ("material addition") includes solid-state or fusion welding, laser material deposition (see column 3 lines 5-6, "deposition"), metal spraying (see column 3 lines 43-44, "laser cladding"), or adhesive bonding ("laser cladding").

As per claim 9, the Rebello et al. reference discloses further including the step of blending the regions (see column 3 lines 35-37, "continuity or other matching conditions") to eliminate seams ("adjuring tooling features") that would be generated due to the subtractive process ("material removal") used.

As per claim 10, the Rebello et al. reference discloses further including the step of creating enclosed (see column 3 lines 21-30, "airfoil 11") and overhanging

features ("dovetail 12") using the additive ("material addition") or subtractive manufacturing processes ("material removal"), or a combination thereof.

As per claim 11, the Rebello et al. reference discloses further including the steps of: identifying changes (see column 2 lines 65-67, "changed") in the desired geometry ("underlying parametric model"); removing excess material ("context model ... change") to achieve the desired geometry ("underlying parametric model").

As per claim 15, the Rebello et al. reference discloses further including the step of generating enclosed cavities (see column 3 lines 21-24, "cavity tooling geometry") within the object ("blade 10") during the fabrication ("manufacturing") thereof.

As per claim 18, the Rebello et al. reference discloses a tool path (see column 3 lines 40-48, "tool path") associated with additive processing ("material addition") is based on the nature of the additive process ("material addition") used.

As per claim 19, the Rebello et al. reference discloses further including the step of incorporating negative draft angles (see figure 2, "dovetail 12") using the additive ("material addition") or subtractive processing ("material removal").

7. Claims 1-4, 7 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,463,349 B2 to White et al.

As per claim 1, the White et al. reference discloses an automated manufacturing method, comprising the steps of: receiving a description (see column 3 lines 45-46, "CAD descriptions") of an object ("objects") to be fabricated ("produced") having a desired geometry (see column 2 lines 26-28, "arbitrary shape"); identifying regions (see column 3 lines 47-48, "cross sections") in which at least one automated material addition process (see column 3 lines 36-37, "ultrasonically powered material addition subsystem") and at least one automated material subtraction process (see column 3 lines 38-39, "milling tool 33") should occur to fabricate the object (see column 2 lines 26-28, "fabrication of objects") in accordance with the description ("CAD descriptions"); generating tool paths (see column 3 lines 47-48, "generate path instructions") associated with the material addition ("material addition") and subtraction processes ("removal"); and fabricating the object ("fabrication of objects") in accordance with the tool paths ("path instructions").

As per claim 2, the White et al. reference discloses the regions ("cross sections") are layers (see column 4 lines 9-13, "foil layers, fiber layers"), volumes ("fiber volume"), lines or voxels ("fiber volume").

As per claim 3, the White et al. reference discloses the automated material subtraction process (see column 4 lines 46-47, "material removal unit") includes milling (see column 2 line 17-20, "drill/mill") or the use of lasers ("laser"), knives ("knife"), hot wires, arc cutters, or plasmas cutters.

As per claim 4, the White et al. reference discloses the automated material addition process (see column 4 line 43, "deposition head") includes solid-state or fusion welding (see column 3 line 59, "ultrasonic welding horn 58"), laser material deposition ("deposition head"), metal spraying, or adhesive bonding.

As per claim 7, the White et al. reference discloses further including the step of soft fixturing multiple parts (see column 4 lines 11-12, "foil layers consolidated around fiber layers").

As per claim 9, the White et al. reference discloses further including the step of blending the regions (see column 7 lines 6-12, "smooth surfaces") to eliminate seams ("each material application") that would be generated due to the subtractive process ("trimming operations") used.

Response to Arguments

8. Applicant's arguments, see page 1 paragraphs 2 and 3, filed 29 March 2006, with respect to the rejections of claims 1-4, 7, 9-11, 15 and 17-22 under 35 USC 102(b) have been fully considered and are not persuasive. Upon further consideration, additional grounds of rejection is made in view of USPN 6,463,349 B2 to White et al.

In response to applicants argument that deAngelis fails to meet the limitation of "generating tool paths associated with the material addition and subtraction processes", the deAngelis reference discloses

(see column 5 lines 45-53, "The main subsystems ... rapid prototyping by layerwise controlled deposition/extraction include (1) a computer and controls subsystem ... (5) a materials additive processes subsystem, (6) a materials subtractive processes subsystem ...")

(see column 6 lines 20-30, "This subsystem takes in a CAD/CAM representation of the prototype part and slices it ... into the sequence of layers (L) used to drive the remaining subsystems. This subsystem generates the process control signals (12) which drive the other subsystems of the apparatus ...")

(see column 7 lines 30-38, "These processes deliver and deposit part materials within the geometric control provided by the respective apparatus ...")

(see column 8 lines 7-11, "The purpose of the materials subtractive, extractive, or removal subsystem 6 ... is to remove part and complementary materials ... as commanded by the computer and controls subsystem 1 ...")

(see column 9 lines 3-8, "The computer and controls subsystem 1 ... the controls generator and system monitor (12), for example, a commercially available computer with CAD/CAM slicing software ...")

In response to applicants' argument that Rebello et al. fails to meet the limitation of "generating tool paths associated with the material addition and subtraction processes", the Rebello et al. reference discloses

(see column 3 lines 3-10, "Manufacturing involves one or more manufacturing steps. Manufacturing steps include all types of manufacturing processes, for example forming steps, material addition steps (for example, deposition), material removal steps (for example machining, EDM or ECM), rapid prototyping steps (for example stereolithography), and finishing steps (for example, shot peening or laser peening). Exemplary machining steps include tool path generation.")

(see column 3 lines 38-45, "... tooling master model 134 further includes process parameters for each manufacturing step and toolpaths. Toolpaths are included for manufacturing processes that include one or more machining or material addition steps. Examples of toolpaths include paths for cutters, lasers, and drills, as well as for solid free form fabrication (for example, laser cladding) and rapid prototyping (for example stereolithography and LOM).")

(see column 5 lines 49-65, "... toolpaths are included for manufacturing processes that include one or more machining steps. For example, if the manufacturing step is a forging, an exemplary tooling geometry 62 includes a die geometry (derived from manufacturing context model 136) and an exemplary tooling master model 134 further includes process parameters, such as press speed, temperature, and load. If the manufacturing step is a machining operation, tooling master model 134 includes toolpaths (geometry) and process parameters, such as cutter speed, type of cutter, and feedrate.")

(see column 11 lines 21-28, "... tooling CAD system 42 is further configured to derive tooling geometry 62 from manufacturing context model 136 using the tooling design rules, as shown in FIG. 3. For manufacturing processes involving one

or more machining steps, CAD system 42 is further configured to derive toolpaths from manufacturing context model 136 using tool path generation rules 242.")

Allowable Subject Matter

9. Claim 20 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to rapid prototyping in general:

USPN 6,447,223 B1 to Farah et al.

USPN 6,410,105 B1 to Mazumder et al.

USPN 5,223,777 to Werner et al.

US Pub. No. 2005/0173380 A1 to Carbone

US Pub. No. 2003/0040834 Coleman et al.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Crystal J. Barnes whose telephone number is 571.272.3679. The examiner can normally be reached on Monday-Friday alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 571.272.3687. The fax

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Crystal J Barnes

CJB
22 May 2006